

In the Claims:

Cancel claims 58-63. Amend claims 17 and 22. Add new claims 64-69.

The status of all claims is as follows:

1-16. (Canceled)

17. (Currently Amended) A passive direct organic fuel cell comprising:
an anode;

an anode enclosure communicating with said anode and containing an organic fuel solution that is at least 1.8 M formic acid, said anode enclosure having a gas remover comprising a plurality of passages that are configured to allow passage of CO₂ from said enclosure while substantially preventing passage of said organic fuel solution, said plurality of passages positioned to promote circulation of said organic fuel solution as gas travels therethrough, said anode enclosure being configured to substantially prevent passage of said fuel solution therefrom during operation of the fuel cell whereby said fuel cell operates as a passive fuel cell;

a cathode communicating with an oxygen source;

a solid polymer electrolyte sandwiched between said anode and said cathode that is substantially impervious to said organic fuel solution; and,

wherein said anode, said cathode, and said electrolyte are operative to generate power having a power density of at least 10 mW/cm² when operating at room temperature.

18. (Original) A passive direct organic fuel cell as defined by claim 17 wherein said fuel solution is at least 4.4 M formic acid and said power density is at least 14 mW/cm².

19. (Original) A passive direct organic fuel cell as defined by claim 17 wherein said fuel solution is at least 8.8 M, and wherein said anode, said cathode, and said electrolyte are operative to generate a power density of at least 10 mW/cm² at a constant voltage of 0.26 V when operating at room temperature for a period of at least 3 hours with no more than 0.6 cc of said fuel solution.

20. (Canceled)

21. (Original) A passive direct organic fuel cell as defined by claim 17 wherein said anode enclosure, said anode and said electrolyte are held together by a polymer sealant that is resistive to formic acid.

22. (Currently Amended) A passive direct organic fuel cell as defined by claim 17 wherein said anode enclosure includes a sealable fill passage for connection to a replaceable fuel cartridge.

23. (Original) A passive direct organic fuel cell as defined by claim 17 and further including a replaceable fuel cartridge made of a PTFE and containing a liquid organic fuel solution, said replaceable fuel cartridge having a recessed valve.

24–50. (Canceled)

51. (Previously Presented) A passive direct organic fuel cell as defined by claim 17 wherein said plurality of passages comprise at least 5 passages.

52. (Previously Presented) A passive direct organic fuel cell as defined by claim 17 wherein said anode enclosure includes a plurality of walls, and wherein each of said plurality of passages have an entrance extending inward into said anode enclosure that is separated from said at least one anode enclosure wall.

53. (Previously Presented) A passive direct organic fuel cell as defined by claim 52 wherein said entrance is separated from said wall by a distance of at least about 0.01 inch.

54. (Previously Presented) A passive direct organic fuel cell as defined by claim 17 wherein said plurality of passages have a length to diameter ratio of at least about 0.5 and have a hydrophobic interior surface.

55. (Previously Presented) A passive direct organic fuel cell as defined by claim 17 wherein said plurality of passages are provided in a ratio of about 20 passages per cm² of useful anode surface area.

56. (Previously Presented) A passive direct organic fuel cell as defined by claim 55 wherein each of said plurality of passages has a diameter of no more than about 1/32".

57. (Previously Presented) A passive direct organic fuel cell as defined by claim 17 wherein said anode enclosure is defined by a plurality of walls, and wherein at least a first of said plurality of passages is in a first of said plurality of walls and at least a second of said plurality of passages is in a second of said plurality of walls.

58. – 63. (Cancel)

64. (New) A passive direct organic fuel cell as defined by claim 17 wherein said anode enclosure further includes a sealing means operable to prevent said fuel solution from exiting said anode enclosure during operation of the passive fuel cell.

65. (New) A passive direct organic fuel cell as defined by claim 64 wherein said sealing means comprises a valve.

66. (New) A passive direct organic fuel cell as defined by claim 17 wherein said anode enclosure is sealed during operation of the passive fuel cell whereby said fuel solution is not exposed to any external pumping during operation of the cell.

67. (New) A passive direct organic fuel cell as defined by claim 17 wherein said anode enclosure further includes one and only one passage for communicating said fuel solution into and out of said anode enclosure.

68. (New) A passive direct organic fuel cell comprising:
an anode;

a sealed anode enclosure communicating with said anode and containing an organic fuel solution that is at least 4.4 M formic acid, said anode enclosure having a gas remover comprising a plurality of passages that are configured to allow passage of CO₂ from said enclosure while substantially preventing passage of said organic fuel solution, said plurality of passages positioned to promote circulation of said organic fuel solution as gas travels therethrough, said organic fuel solution contained in said sealed anode enclosure being free from circulation by pumping;

a cathode communicating with an oxygen source;

a solid polymer electrolyte sandwiched between said anode and said cathode that is substantially impervious to said organic fuel solution; and,

wherein said anode, said cathode, and said electrolyte are operative to generate power having a power density of at least 14 mW/cm² when operating at room temperature.

69. (New) A passive direct organic fuel cell comprising:
an anode;

an anode enclosure communicating with said anode and containing an organic fuel solution that is at least 8.8 M formic acid, said anode enclosure having a gas remover comprising a plurality of passages that are configured to allow passage of CO₂ from said enclosure while substantially preventing passage of said organic fuel solution, said plurality of passages positioned to promote circulation of said organic fuel solution as gas travels therethrough;

a cathode communicating with an oxygen source;

a solid polymer electrolyte sandwiched between said anode and said cathode that is substantially impervious to said organic fuel solution; and,

wherein said anode, said cathode, and said electrolyte are operative to generate power having a power density of at least 10 mW/cm² at a constant voltage of 0.26 V when operating at room temperature for a period of at least 3 hours with no more than about 0.6 cc of said fuel solution.